REMARKS

Claims 13-15

Claims 13-15 have been rejected under 35 USC 112, first paragraph. Applicants direct the Examiner's attention to p. 5, lines 4-8, where one illustrative process is described. In that exemplary process, the surface of the first ferromagnetic layer is exposed to the oxygen for about 30 seconds. Those skilled in the art will appreciate that, in this example, such a short exposure time will inherently result in the subsequent or spacer layer being deposited prior to significant oxidation of the first ferromagnetic layer. Accordingly, withdrawal of the rejection is respectfully requested.

Claims 1, 8, 9, 10, 13, 15

Claims 1, 8, 9, 10, 13 and 15 have been rejected under 35 USC 102(e) as being anticipated by Sato et al. (US5986858).

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Moreover, the identical invention must be shown in as complete detail as contained in the claim. *Richardson v. Suzuki Motor Co.* 868 F.2d 1226, 1236, 9USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

Claim 1 has been amended to require exposing at least the first surface to an oxygen partial pressure for causing oxygen to become physisorbed onto at least the first surface for forming an oxygen treated surface having a reduced surface roughness, then decreasing the oxygen partial pressure before depositing a subsequent layer onto the oxygen treated surface having the reduced surface roughness.

In sharp contrast, the rejection of claim 1 states that Sato discloses forming a first ferromagnetic layer 42B of Co by sputtering and then exposing the layer to oxygen to produce a CoOx layer 42C. The rejection continues by indicating that after that, the

aluminum film is formed by sputtering and then exposed to oxygen to form an AlOx layer.

Those skilled in the art will appreciate that the surface roughness of a pure metal actually *increases* as a significant amount of oxygen atoms become incorporated into the pure metallic structure during oxidation, thereby deforming the metallic structure. In the instant case, Sato requires that his Al layer be oxidized to the extent that if forms a tunnel oxide film of Al2O3. See Sato col. 14, lines 31-34. Similarly, the Co layer is exposed to an oxygen atmosphere for a duration of about 1 hour. See Sato col. 14, lines 39-42. Consequently, these oxide layers will inherently have a higher surface roughness than the pure metallic layers originally deposited.

Applicants have also recognized that longer exposures to oxygen actually result in an increase in surface roughness. As noted in FIG. 4 of the present application and related discussion at p. 11, lines 13-18, the surface roughness increases with prolonged oxygen exposure.

Accordingly, the amendment to claim 1 is believed to make claim 1 allowable over Sato.

Claims 8, 10 and 13 depend from claim 1, and therefore incorporate the limitations of claim 1. By virtue of their dependence, claims 8, 10 and 13 are also believed to be allowable.

Claim 9 has been amended to require exposing the first surface to an oxygen partial pressure for causing oxygen to become physisorbed onto the first surface for forming a first oxygen treated surface having a reduced surface roughness relative to the first surface prior to exposure to the oxygen, then decreasing the oxygen partial pressure before depositing a subsequent layer onto the first oxygen treated surface having reduced surface roughness; and exposing the second surface to an oxygen partial pressure for causing oxygen to become physisorbed onto the second surface for forming a second oxygen treated surface having a reduced surface roughness relative to the second surface prior to exposure to the oxygen, then decreasing the oxygen partial

pressure before depositing a subsequent layer onto the second oxygen treated surface having reduced surface roughness.

In sharp contrast, the rejection of claim 9 states that Sato discloses forming a first ferromagnetic layer 42B of Co by sputtering and then exposing the layer to oxygen to produce a CoOx layer 42C. The rejection continues by indicating that after that, the aluminum film is formed by sputtering and then exposed to oxygen to form an AlOx layer.

Those skilled in the art will appreciate that the surface roughness of a pure metal actually *increases* as a significant amount of oxygen atoms become incorporated into the pure metallic structure during oxidation, thereby deforming the metallic structure. In the instant case, Sato requires that his Al layer be oxidized to the extent that if forms a tunnel oxide film of Al2O3. See Sato col. 14, lines 31-34. Similarly, the Co layer is exposed to an oxygen atmosphere for a duration of about 1 hour. See Sato col. 14, lines 39-42. Consequently, these oxide layers will inherently have a higher surface roughness than the pure metallic layers originally deposited.

Applicants have also recognized that longer exposures to oxygen actually result in an increase in surface roughness. As noted in FIG. 4 of the present application and related discussion at p. 11, lines 13-18, the surface roughness increases with prolonged oxygen exposure.

Accordingly, the amendment to claim 9 is believed to make claim 9 allowable over Sato.

Claim 15 depends from claim 9, and therefore incorporates the limitations of claim 9. By virtue of its dependence, claim 15 is also believed to be allowable.

Claims 6, 7

Claims 6 and 7 have been rejected under 35 USC 103(a) as unpatentable over Sato in view of Pinarbasi (US5871622).

The rejection applies Sato as for claim 1. Claims 6 and 7 depend from claim 1, and therefore the amendments to claim 1 are believed to distinguish claim 1 from Sato.

Because Pinarbasi has merely been added to allegedly show introduction of oxygen via a shutter, claims 6 and 7 are believed to be allowable over the combination proposed by the Examiner. Reconsideration and allowance of claims 6 and 7 is respectfully requested.

Further, regarding claim 7, claim 7 has been amended to require that no additional metal is deposited until the oxygen partial pressure is decreased. In sharp contrast, Pinarbasi adds Al atoms to the oxygen atmosphere, such that alumina is deposited when the shutter is opened. See Pinarbasi col. 6, lines 57-64. By virtue of the amendment, claim 7 is believed to be allowable.

Claims 2-5, 14

Claims 2-5 and 14 have been rejected under 35 USC 103(a) as unpatentable over Sato in view of Deguchi et al. (US5862021).

The rejection applies Sato as for claim 1. Claim 2 contains similar limitations to claim 1, and therefore the rejection suffers from the same deficiencies as set forth above with respect to claim 1. Because Deguchi has merely been added to allegedly show a partial pressure of oxygen, claims 2-5 and 14 are believed to be allowable over the combination proposed by the Examiner. Reconsideration and allowance of claims 2-5 and 14 is respectfully requested.

Claims 11-12

Claims 11-12 have been rejected under 35 USC 103(a) as unpatentable over Sato in view of Deguchi and in yet further view of Pinarbasi.

The rejection applies Sato and Deguchi as for claims 2-5 above. Claims 11 and 12 depend from claim 2, and therefore the rejection suffers from the same deficiencies as set forth above with respect to claim 2. Because Pinarbasi has merely been added to allegedly show introduction of oxygen via a shutter, claims 11-12 are believed to be allowable over the combination proposed by the Examiner. Reconsideration and allowance of claims 11-12 is respectfully requested.

Further, regarding claim 12, claim 12 has been amended in a manner similar to claim 7, and therefore is believed to be allowable for similar reasons.

In the event a telephone conversation would expedite the prosecution of this application, the Examiner may reach the undersigned at (408) 971-2573. For payment of any additional fees due in connection with the filing of this paper, the Commissioner is authorized to charge such fees to Deposit Account No. 09-0466 (Order No. SJO920000063US2).

Respectfully submitted,

By: /Dominic M. Kotab/ Date: January 9, 2007

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